

FACTORS DETERMINING THE LIQUIDITY OF COMPANIES IN THE MECHANICAL ENGINEERING INDUSTRY IN SLOVAKIA – AN EMPIRICAL STUDY

LUBICA LESÁKOVÁ, MIROSLAVA VINCZEOVÁ,
VERONIKA ŠPINER

ABSTRACT

Liquidity is one of the main characteristics of the financial situation of a company. A lack of liquidity may seriously affect the continuity of a firm's activities. A thorough analysis and knowledge of the factors affecting the liquidity of a company are an essential requirement of the informed adoption of measures aimed at ensuring company liquidity. This issue is the subject of the presented paper. The main purpose of the article is to analyse the development of liquidity in the mechanical engineering industry in the Slovak Republic (SK NACA rev. 2 28xx – Manufacture of machinery and equipment not elsewhere classified) during the period of 2015-2018, and to identify the key internal and external factors determining liquidity in the industry. The survey was carried out in 2019 on a sample of 398 companies in the specified industry. Sample representativeness was tested on the basis of the non-parametric chi-square goodness of fit test (χ^2 distribution test). The obtained data were processed by means of statistical methods. To perform the statistical analysis, we applied the methods of descriptive statistics, frequency tables and non-parametric tests (the Friedman and Wilcoxon tests). To verify the validity of the formulated hypotheses, we used the right-tailed test of the hypothesis on the relative frequency. The main finding of the research is the identification of the key internal and external factors determining the liquidity of engineering companies in Slovakia. The results of the research allow companies to take effective measures in managing liquidity and supporting their favourable development.

KEY WORDS

Liquidity, factors determining liquidity, machinery industry, engineering companies, Slovak Republic.

DOI: 10.23762/FSO_VOL8_NO3_2

LUBICA LESÁKOVÁ¹

e-mail: lubica.lesakova@umb.sk

MIROSLAVA VINCZEOVÁ

e-mail: miroslava.vinczeova@umb.sk

Matej Bel University,

Banská Bystrica, Slovakia

VERONIKA ŠPINER

e-mail: veronika.spiner@gmail.com

¹Corresponding author

Introduction

The main objectives of a company include profit generation, the maintenance and increase of its market value, and long-term self-financing ability, while at the same time ensuring its liquidity (Wach, 2020).

The failure to achieve some of these aims can jeopardise the overall financial stability of a company. Several empirical examples confirm that a company can be profitable while at the same time having difficulties

with the settlement of its obligations. This may indicate significantly different developments of profit and liquidity. A company which is unable to pay its obligations is exposed to the risk of reputational loss, and hence competitiveness, which could even bring about bankruptcy (Gryglewicz, 2010; Emery et al., 2007). Due to insolvency, the company loses the confidence of suppliers and is unable to grant trade credit, thus losing its potential customers and, consequently, experiencing difficulties in obtaining new loans due to the lack of willingness on the part of the bank to bear the risk of non-payment.

Efficient and effective liquidity management requires more than the calculation and interpretation of liquidity ratios. It is also highly important to analyse the factors affecting liquidity, particularly in the context of long-term business development and sustainability. However, literature on this topic offers a limited range of studies. Yet the identification of the determinants of liquidity appears necessary for a better understanding of the results of the liquidity analysis and for making well-informed financial decisions, while also taking the potential risks endangering the firm's financial stability into account. Thus, the qualified adoption of liquidity measures in businesses requires a detailed liquidity analysis together with a thorough knowledge of the factors affecting the situation. The issue is the subject of the presented research paper. Its aim is to analyse the development of liquidity in the mechanical engineering industry in the Slovak Republic (SK NACE rev. 2 28xxx – Manufacture of machinery and equipment not elsewhere classified) during the period of 2015-2018, and identify the key internal and external factors which determine liquidity in the industry.

1. Theoretical background

Liquidity management is an integral part of financial management in any company. Each financial manager should be involved in liquidity management, as a company should be able to honour its financial obligations at all times.

Adequate liquidity management is also important in terms of long-term business development, as it may significantly affect the investment rate of firms as well as the dynamics of their size and growth (Oliveira and Fortunato, 2006; Šimberová et al., 2015). Talonpoika et al. (2016) argue that liquidity, together with profitability, growth and solvency, are the four main factors in the survival of a company. Liquidity management is a crucial managerial area and financial managers presumably devote the major portion of their time and attention to working capital management (Hiadlovský et al., 2016; Brigham and Houston, 2012; Atrill, 2006). The financial crisis in 2007-2009 saw the replacement of companies' focus on earnings with a focus on cash and liquidity (Blach et al., 2014). Therefore, it can undoubtedly be claimed that the reliable and consistent analysis of liquidity, a thorough knowledge of the internal and external factors affecting it and its efficient management (based on analysis) are vitally important for any firm nowadays.

Among Slovak authors, Zalai and Vlachynský are considered the pioneers of liquidity analysis and management. Sedláček (2016) addresses the examination of liquidity, its analysis and management in the context of financial controlling. Lesáková (2015) defines liquidity analysis as the measurement of the firm's ability to meet its payment obligations by means of cash derived from business activities.

Liquidity analysis focuses on the examination of the firm's ability to settle its current liabilities, thus achieving short-term

financial stability. Liquidity ratios are used to analyse and assess the firm's liquidity (Vause, 2014; Pointer and Khoi, 2019). They provide information about how the company is able to cover the obligations payable during the year by means of its liquid assets (Zalai, 2016). The liquidity ratios include part of the assets usually cashable within one year. Current assets, after the exclusion of long-term receivables or receivables whose payment is questionable as well as remnant and unnecessary stock, correspond to this characteristic. According to asset marketability, there are three degrees of liquidity (Sedláček, 2016; Vlachynský, 2006).

The two most common ratios intended to measure the liquidity of a company's assets in proportion to its liabilities are the current ratio and quick (acid test) ratio, defined as:

Current ratio = Current assets / Current liabilities

Quick (acid test) ratio = (Current assets – Stock) / Current liabilities

The current ratio measures the firm's ability to meet its short-term obligations. A company with a low current ratio lacks liquidity in the sense that it cannot reduce its current asset investments to supply cash to meet maturing obligations. It must rely instead on operating income and outside financing (Higgins, 2003; Drever and Hutchinson, 2007). A high current ratio does not necessarily mean a company is in a good shape. It could mean that its cash is not being put to the best use. Also, it does not indicate the state of debtors or stock which may have brought about the high ratio (Vause, 2014; Ekanem, 2010).

A quick version of the current ratio eliminates stock from the current assets. It is referred to as the quick ratio or the 'acid test' ratio (it is a frequently used liquidity measure). The quick ratio is the simplest, and arguably the most effective, measure of

a company's short-term financial position. It is assumed that stock will not prove an immediate source of cash, so it is ignored (Vause, 2014; Knápeková and Pavelková, 2010). It is not difficult to calculate this ratio. The result provides a simple indication of the firm's liquidity.

The interpretation of liquidity ratios is sensitive to the sector and industry in which the company operates. The industry mean values, which represent a sort of industry-wide norm of liquidity, provide explanations for the behaviour of companies which is not captured in the general calculation of ratios (Ekanem, 2010; Bruinshoofd and Kool, 2002). This implies that, when assessing the firm's liquidity, there is a need to take into account the firm's scope of activity in relation to the structure of current assets as well as the static character of data entering into the calculation (Basir, 2018; Carraher and Auken, 2013).

Keeping track of the company's liquidity ratios provides an important initial picture of its working capital position (Buche, 2016; Emery et al., 2007). Knápeková et al. (2013) justify the wide-ranging application of the liquidity analysis by means of ratios on the grounds that they allow one to quickly obtain an insight into the essential attributes of liquidity and capture the areas requiring a more in-depth analysis, enabling one to carry out the trend analysis of the financial situation; therefore, they are an appropriate instrument of cross-sectional analysis (i.e. a comparison of businesses within the industry).

According to Sedláček (2016), liquidity analysis is static because it relates to the date of the annual accounts which are static in character. This static view is provided by traditional ratios designed to measure a company's ability to meet its obligations through the liquidation of assets (Lancaster et al., 1999; Brigham and Houston, 2012). Static measures of liquidity have some ad-

vantages over those which are considered dynamic. They are quick and easy to compute, and focus on the impact of all current liabilities, whereas some dynamic measures (e.g. the cash conversion cycle) only focus on the impact of accounts payable (Cagle et al., 2013). Nevertheless, the static nature of liquidity analysis has been criticised by a number of economists. Gibson (2012) and some scholars (Sedláček, 2016; Knápeková and Pavelková, 2010) recommend analysing liquidity by means of liquidity indices, differential financial indicators and cash flow, which they consider to be better indicators of a firm's liquidity and financial stability. They do not attempt to exclude the use of liquidity ratios, but recommend using the indicators in a reasonable way and respecting their weaknesses.

Liquidity is considered one of the most crucial areas in financial management and decision-making (Vinczeova and Krištofík, 2013; Atrill, 2006; Eljelly, 2004). If a company fails to achieve an appropriate level of liquidity, it may result in two different situations: surplus liquidity or a liquidity deficit. The maintenance of its optimal level is a cardinal role of working capital management, as it leads to the proper balance of liquidity and profitability and thereby to the enhanced value of the firm (Rehman et al., 2015; Kim et al., 1998).

It is quite difficult to ensure the optimal liquidity of a company; however, there are various options to help. In order to have a desirable impact on liquidity, the company has to identify the factors affecting it.

Specialised literature describing the factors affecting company liquidity generally builds on the cash flow statement and the construction of liquidity ratios (Zalai et al., 2016; Sedláček, 2016; Gibson, 2012; Higgins, 2003). The indicator of cash flow generated by a company's economic activities is considered a key factor. Making a profit on each transaction and ensuring the ear-

liest possible conversion of profit to cash through efficient financial management is the best way to generate sustainable positive cash flow. Profitability itself, however, is not sufficient for a firm to be liquid – the firm has to take care of the appropriate levels of stock and its structure, the continuous monitoring and collection of claims, and the proper level of short-term debts. Those are the tasks of net working capital management (Gibson, 2012; Knápeková and Pavelková, 2010; Zalai et al., 2016). All these factors have a significant impact on a firm's liquidity. The abovementioned authors therefore emphasise the importance of the analysis of the level and structure of current assets and short-term debts.

Company liquidity is also determined by its scope of business (which affects the structure of current assets and liquidity of particular current assets), the situation on the market (demand, competition), a firm's overall operating activities (an active trade policy, rapid response to market needs) and other non-financial factors or external factors (Vlachynský, 2006; Sedláček, 2016; Ekanem, 2010). Minimal attention has been paid to these factors in research to date. Therefore, our research topic will be not only the analysis of internal financial factors affecting company liquidity, but also the analysis of internal non-financial and external factors.

2. Methodology

In light of the objective, which is to analyse the development of liquidity in the selected industry (SK NACE rev. 2 28xxx – Manufacture of machinery and equipment not elsewhere classified) in the Slovak Republic during the period of 2015-2018 and identify the key internal and external factors which determine liquidity in the industry, we formulated four hypotheses:

H1: We assume that more than 60 per cent of engineering companies in the

industry SK NACE Rev. 2 "Manufacture of machinery and equipment not elsewhere classified" in the Slovak Republic experienced growth in liquidity in the period of 2015-2018.

H2: We assume that more than 70 per cent of engineering companies in the analysed industry in the Slovak Republic carry out the analysis of current liquidity only.

H3: We assume that more than 75 per cent of engineering companies in the analysed industry in the Slovak Republic consider "adequate and regular cash flows ensuring the settlement of due debts" to be a crucial internal factor affecting liquidity.

H4: We assume that more than 60 per cent of engineering companies in the analysed industry in the Slovak Republic consider "secondary insolvency" to be a crucial external factor affecting liquidity.

When formulating hypotheses, the percentage estimates were determined on the basis of the preliminary results of the pre-research, which was carried out in the form of a questionnaire in early 2019 on a sample of 38 firms operating in the mechanical engineering industry. The pre-research results enabled the researchers (in accordance with the formulated objective) to divide the hypotheses into two groups. The first (main) hypothesis relates to the development of liquidity in the mechanical engineering industry between 2015 and 2018, while the next three hypotheses concern the liquidity indicator most frequently analysed in the surveyed industry and the identification of the key internal and external factors affecting liquidity in businesses operating in that industry.

We used several sources of secondary data obtained from statistical surveys and publications of the Slovak Business Agency and Business Alliance of Slovakia. A valuable source of information were the final accounts of businesses, data obtained from the yearbooks "Stredné hod-

noty finančných ukazovateľov ekonomických činností Slovenskej republiky" for the period of 2015-2018 (published by the Slovak Credit Bureau and providing the mean values of financial ratios of companies applying the double-entry method of bookkeeping) and data provided by the Statistical Office of the Slovak Republic. Primary data were collected by means of a questionnaire survey carried out of Slovak companies in the selected industry.

The parent population represents engineering companies established in the Slovak Republic which are active in the industry classified under SK NACE Rev. 2. 28 – Manufacture of machinery and equipment not elsewhere classified. Division 28 includes the manufacturing of machinery and equipment operating independently of materials either mechanically or thermally, or treating materials (i.e. treatment, spraying, weighing, or packaging), including their mechanical parts which produce and use power, and all specially produced primary parts. It contains fixed and mobile or manual devices, irrespective of whether they are manufactured for mechanical or construction engineering, agricultural or domestic use. The production of special equipment for passenger or freight transport beyond determined borders also belongs to this division.

Based on the data of the Statistical Office of the Slovak Republic for 2018, there are 752 businesses active in the selected industry (micro-enterprises were excluded from our research). Small enterprises account for 79 per cent, medium-sized enterprises 17 per cent and large enterprises just under four per cent of the parent population.

To determine a sample of enterprises, we chose the number of employees as a criterion. The survey was carried out on a sample of companies in the specified industry. We distributed 752 questionnaires

and received back 398 correctly completed questionnaires (representing a response rate of 52.9 per cent). The sample thus contained 398 companies. In terms

of size, the sample contained 294 small enterprises, 80 medium-sized enterprises and 24 large enterprises.

Table 1. Structure of enterprises in the parent population and in the research sample

Size of enterprise	Parent population	Percentage	Sample	Percentage
Small enterprises	594	78.99	294	73.87
Medium-sized enterprises	128	17.02	80	20.10
Large enterprises	30	3.99	24	6.03
Total	752	100	398	100

Source: Own elaboration.

Sample representativeness was tested on the basis of the non-parametric chi-square goodness of fit test (χ^2 distribution test). On the basis of the results of testing by means of the statistical software SPSS, we can state that, at the $\alpha = 0.1$ significance level, we do not reject the null hypothesis (the p -value = 0.292 is higher than the significance level $\alpha = 0.1$). The sample is therefore representative and the results of statistical testing can be generalised within the entire parent population.

Data were collected between March and June 2019. The obtained data were processed by means of statistical methods. To perform the statistical analysis, we applied the methods of descriptive statistics, frequency tables and non-parametric tests (the Friedman and Wilcoxon tests).

To verify the validity of the formulated hypotheses, we used the right-tailed test of the hypothesis on the relative frequency. In accordance with all principles of testing of statistical hypotheses on the relative frequency, if the null hypothesis is valid, the test characteristic takes the following form:

$$u = p - \pi_0 / \sqrt{\pi_0 \cdot (1 - \pi_0)} : n$$

where π denotes the relative frequency (relative abundance) of statistical units possessing the required property in the analysed sample, and π_0 is its expected (estimated) value. The p value represents the sampling rate, described as $p = k/n$, where

k is a random selection of the number of units with a specific property from the file of the analysed units and n is the number of statistical units in the sample.

The decision whether to accept or reject the null hypothesis H_0 is made on the basis of the critical values (quantiles) of the standard normal distribution which is valid for the determined significance levels ($\alpha=0,1$; $\alpha=0,05$; $\alpha=0,01$). We reject the null hypothesis H_0 if $u > u_\alpha$ in the right-tailed test.

Other methods used in this study are the methods of causal analysis, deduction, abstraction, comparison, and synthesis.

3. Results and discussion

In the first part of the research we made enquiries as to whether engineering companies in the analysed industry conduct liquidity analyses (and if so, how often), and which indicators they use. Subsequently we analysed the development of the main liquidity indicators between 2015 and 2018. The research also involved the comparison of liquidity indicators in the businesses analysed with the mean values of liquidity indicators in the industry over the period of 2015-2018.

The results indicate that all companies analysed carry out liquidity analysis. More than 55 per cent of managers devote attention daily to liquidity analysis, 35 per cent of them deal with liquidity analysis at least once a week and 10 per cent of managers undertake such an analysis once within

a period of 10 to 14 days. Only 96 businesses out of 398 monitor all three degrees of liquidity (they also provided their values). The remaining 302 respondents monitor current liquidity only.

Following the results, it is evident that 75 per cent of companies reported growth in liquidity indicators (current liquidity) dur-

ing the period of 2015-2018, 23 per cent of them confirmed a decrease, and the remaining respondents (two per cent) did not answer. The responses received were compared with the mean values of liquidity indicators in engineering companies from the analysed industry in the Slovak Republic during the period of 2015-2018.

Table 2. Medians of current ratio and quick ratio in Industry 28 – Manufacture of machinery and equipment not elsewhere classified

Ratio	2015	2016	2017	2018
Current ratio	1.32	1.31	1.59	1.61
Quick ratio	1.07	1.08	1.28	1.29

Source: Own elaboration based on *Odvetvové pomenové...*, 2019.

Table 2 shows the development of liquidity in engineering companies as classified in division 28 by means of the current and quick ratios. As can be seen, the values of both ratios showed a rise in the period of 2015-2018. Based on the comparison of the liquidity indicators in the analysed companies with the mean values in the industry "Manufacture of machinery and equipment not elsewhere classified", we can observe the identical development over the period of 2015-2018.

The research results enabled the researchers to verify the validity of the formulated hypotheses *H1* and *H2*. For testing, we calculated quantiles of the standard normal distribution for the right-tailed test of the hypothesis for the significance level α . Their values are as follows: if $\alpha = 0,1$, then $u_{\alpha} = 1,28$; if $\alpha = 0.05$, then $u_{\alpha} = 1.64$; if $\alpha = 0.01$, then $u_{\alpha} = 2.33$.

The hypothesis *H1* assumes that more than 60 per cent of engineering companies in the Slovak Republic reported the growth of liquidity from 2015 to 2018. To accept or reject the hypothesis, we calculated the value of the test characteristic u ($p = 298 : 398 = 0.7487$).

$$u = p - \pi_0 / \sqrt{\pi_0 \cdot (1 - \pi_0)} : n = 0.7487 - 0.60 / \sqrt{0.60 \cdot 1 - 0.60} : 398 = 6.06$$

On the basis of the comparison of the calculated test characteristic ($u = 6.06$) and the quantiles of the standard normal distribution for all three significance levels u_{α} , we reject the null hypothesis. It follows from the above that the presumption that more than 60 per cent of engineering companies have reported growing liquidity over the period of 2015-2018 can be confirmed.

We subsequently also verified the hypothesis *H2*, which assumes that more than 70 per cent of engineering companies in the Slovak Republic carry out the analysis of current liquidity only. Out of the total of 398 companies, 302 conduct the analysis of current liquidity only ($p = 302 : 398 = 0.7587$). Based on the comparison of the test characteristic ($u = 2.5633$) and the quantiles of the standard normal distribution for all three significance levels u_{α} , we reject the null hypothesis.

$$u = p - \pi_0 / \sqrt{\pi_0 \cdot (1 - \pi_0)} : n = 0.7587 - 0.70 / \sqrt{0.70 \cdot (1 - 0.70)} : 398 = 2.5633$$

Therefore, we can confirm the hypothesis *H2*, in other words, that more than 70 per cent of engineering companies conduct the analysis of current liquidity only.

The identification of the main factors affecting liquidity in engineering companies was a core part of the research. The fac-

tors were divided into internal (financial and non-financial) factors and external factors. To evaluate the responses to the questionnaire, we applied the Friedman and Wilcoxon tests. The factors were ranked by means of the Friedman test in accordance with the values assigned by respondents. The significance of the ranking of factors affecting company liquidity in the analysed sample was determined by the Wilcoxon test. The results are shown in Table 3.

Using the Friedman test, we found the five most significant internal financial factors affecting the liquidity of engineering companies in the Slovak Republic include adequate and regular cash flows, accounts receivable, accounts payable, advance payments and the volume and structure of stock.

Table 3. Internal financial factors affecting the liquidity of engineering companies in the Slovak Republic – Friedman test

Internal financial factors	Friedman test value
Adequate and regular cash flows ensuring the settlement of due debts	4.80
Accounts receivable	4.44
Accounts payable	4.19
Advance payments	3.47
Volume and structure of stock	3.16
Other	1.04

Source: Own elaboration.

Adequate and regular cash flow ensuring the settlement of due debts was reported to be the most important internal financial factor affecting liquidity. This is determined by the volume of successfully implemented contracts and their timely settlement. Liquidity is directly related to cash flows and the nature of a company's short-term assets; that is, whether there is an appropriate amount of cash on hand or readily available. If the cash inflow from operations is not consistently the major source of the company's funds, it is necessary to find out why and then decide whether it is reasonable to assume that this state of affairs can continue. Competition on the domestic and foreign markets is particularly strong in the segment of engineering companies. The active trade and marketing policies, which help to bring in new customers and contracts, is one of the main prerequisites of regular cash flows.

The requirement for timely compliance with payment obligations in accordance with the firm's strategic goals is an attribute of the financial policy of any company. In engineering companies, *receivables and payables* are a significant factor influencing a firm's solvency. The maturity of supplier and customer invoices is a process of a certain duration. Companies endeavour to ensure the maturity of supplier invoices is as long as possible (the optimal maturity is 60 days). On the other hand, they try to negotiate the shortest possible maturity of receivables with customers. It is common for suppliers' invoices to already be several days overdue by the time they are processed, approved and ready for payment. Managers claim that the liquidity of engineering companies is largely affected by customers' payment discipline.

Advance payments from customers are common in engineering companies as an important source of finance, given their

production character. They can bridge the time lag between production expenditures and receipts for finished products. The terms of advance payments depend on the position of both parties, their capital strength, the overall market situation, and, in particular, on how legally secure the business is.

Stock issues are increasingly coming to the fore. They are relatively complex as they directly or indirectly influence several processes in a company. An example is when the purchase department promotes higher emergency stock to allow greater manufacturing flexibility; while on the other hand, the financial department attempts to minimise the stock volume to limit the capital committed to stock, thus preventing liquidity problems. While it holds true that the length of the operational cycle is shorter than a year in most engineering

companies, this may not always be the case. In some engineering companies in which sales payments are received in instalments (the collection of instalments is spread over 12 to 36 months), the length of the operational cycle is longer than a year, and yet such receivables are considered to be current assets.

Short-term bank loans are a significant tool by which to overcome a short-term lack of cash (resulting from seasonal and other fluctuations in the transformation process of engineering companies). These companies most often use bank overdrafts and short-term special-purpose loans.

The results of the questionnaire survey enabled the researchers to identify the key *internal non-financial factors* affecting the liquidity of engineering companies in the Slovak Republic. Table 4 presents the results of the Friedman test.

Table 4. Internal non-financial factors affecting the liquidity of engineering companies in the Slovak Republic – the Friedman test

Internal non-financial factors	Friedman test value
Active search for new opportunities	3.82
Promptly responding to market demands	3.66
Quality of management	2.12
Increasing innovativeness	2.06
Communication at different levels of management/departments	0.72

Source: Own elaboration.

Respondents consider "the active search for new opportunities" (with a Friedman test value of 3.82) to be the most significant non-financial factor. It can be justified by special features of the mechanical engineering market. Nowadays, there should be ever more intensive effort to look for new market opportunities translating into real contracts (Sroka and Gajdzik, 2015). Many engineering companies attempt to gain potential customers, not only in Europe, but also further afield, in particular in the Middle East. Trade with third-world countries has started to become attractive,

especially during the last three years. Expansion to these countries not only offers new opportunities, but also the possibility of upgrading products or obsolete production processes.

Another factor – the *quality (dynamics, flexibility) of management* (with a Friedman test value of 2.12) is related to an active and prompt response to market requirements (3.66). These two factors are closely linked. Since management has an interest in the successful development of the firm, it has to be active in searching for new market opportunities. Only well-prepared and flexible

management can respond to the market situation in an active and prompt manner (Szczepańska-Woszczyńska and Kurowska-Pysz, 2016; Kovalová, 2016; Korenková et al., 2019; Šebestová and Sroka, 2020).

The Wilcoxon test determined the ranking significance of the internal factors influencing the liquidity of engineering companies in the Slovak Republic.

Table 5. Internal factors affecting the liquidity of engineering companies in the Slovak Republic – the Wilcoxon test

Internal factors	Wilcoxon test – ranking
Adequate and regular cash flows	4.80
Accounts receivable	4.44
Accounts payable	4.19
Active search for new opportunities	3.82
Promptly responding to market requirements	3.66

Source: Own elaboration.

The research findings enabled the researchers to verify the hypothesis H_3 , which stated that more than 75 per cent of engineering companies in the Slovak Republic consider adequate and regular cash flows ensuring the settlement of due debts to be the key internal factor affecting firm liquidity. Out of 398 companies, 324 identified it as being the most crucial factor. To verify the validity of the hypothesis we applied the right-tailed test of the relative frequency hypothesis. The test characteristic has the following value:

$$u = p - \pi_0 / \sqrt{\pi_0 \cdot (1 - \pi_0)} : n = 0.8141 - 0.75 / \sqrt{0.75 \cdot (1 - 0.75)} : 398 = 2.9493$$

On the basis of the calculated test value ($u = 2.9493$) and quantiles of the standard normal distribution (u_α), we reject the null hypothesis. The hypothesis H_3 , according to which more than 75 per cent of engineering companies consider adequate and regular cash flows to be the most crucial factor influencing the liquidity of engineering companies, can be confirmed.

Furthermore, we made enquiries to managers as to which *external factors* most significantly affect company liquidity in the industry. They reported the three most significant external factors, including secondary insolvency, globalisation (internationalisation) and competition.

Table 6. External factors affecting the liquidity of engineering companies in the Slovak Republic – the Friedman test

External factors	Friedman test value
Secondary insolvency	4.08
Globalisation (internationalisation)	3.52
Competition	3.23
Negative impacts of the economic crisis	3.19
State measures and interventions (in the form of new laws)	0.70
Other	0.15

Source: Own elaboration.

Respondents consider *secondary insolvency*, resulting from late payments made by customers, to be the most important external factor influencing liquidity. Conse-

quently, the company is not able to meet its obligations as its cash is locked up in receivables. This is due to a number of reasons, such as insufficient verification

of trading partners, the underestimation of their risk, or inefficient debt recording and recovery.

It is interesting to note that several engineering companies identified *globalisation* (*internationalisation*) as causing a lack of liquidity. Globalisation has interconnected country markets and made a significant contribution towards the growth of the competitive environment (respondents also identified this as a significant factor). The nature of production and trade has gradually changed from national to global. This demands a great deal of managers, who are expected to make appropriate choices in a timely and correct manner so that the company has a fully-resourced production program with sufficient funds available for its activities.

Other factors account for a much lower share of answers.

According to the hypothesis *H4*, we assume that more than 60 per cent of engineering companies in the analysed industry consider secondary insolvency to be the key external factor affecting firm liquidity. 275 businesses out of a total of 398 identified it as being the most crucial. The test characteristic has the value:

$$u = p - \pi_0 / \sqrt{\pi_0 \cdot (1 - \pi_0)} : n = 0.6909 \\ - 0.60 / \sqrt{0.60 \cdot (1 - 0.40)} : 398 = 3.7102$$

On the basis of the comparison of the test characteristic ($u = 3.7102$) and quantiles of the standard normal distribution (u_α), we reject the null hypothesis. We confirm the hypothesis *H4* which states that that more than 60 per cent of engineering companies in the analysed industry in the Slovak Republic consider secondary insolvency to be the most crucial external factor affecting firm liquidity.

Our research findings, *inter alia*, identify the relevant factors affecting company liquidity. Their knowledge is a prerequisite for active management in both the short

and long term (Cumming, Groh, 2018). The key to preserving company liquidity in particular is the short- and long-term balance between receipts and expenditures; therefore, financial managers should continuously keep a close eye on it. There is a large variety of possible measures and recommendations which can be helpful in this area.

A key measure by which to improve firm liquidity, and hence the financial health and stability of engineering companies, is to draw up a financial plan supporting the continuous monitoring and evaluation of the generation and use of short- and long-term sources of finance (in terms of ensuring current liquidity). Access to appropriate sources of finance can significantly support the liquidity of manufacturing firms, which is required in order for them to pursue market opportunities, develop innovations and remain competitive (Madrid-Guijarro et al., 2007). A sound financial plan is a necessity in these firms as it consequently links the financing process with other areas of financial management in engineering companies – the allocation of sources of finance, profit generation and distribution and operational management of cash flows, which is particularly important for liquidity (Revsine et al., 2015).

To strengthen cash flow generation, the operational plan and a budget for receipts and expenditures should be the norm. They should be linked to the annual cash flow plan and operational budgets and be divided into sections which are as short as possible (depending on cash flows and the size of the firm) – over months, weeks or days, in order to eliminate the influence of several negative aspects. That is related to the planning and management of adequate and regular cash flows, identified above as a key internal factor affecting firm liquidity.

The research results show that a number of companies face difficulties with respect to debt recovery and the settlement of debts, as they hold debts that are overdue, which results in secondary insolvency. This factor was identified as a key external factor affecting company liquidity. Companies should take preventive measures in the field of management of claims and obligations to reduce possible negative effects. They should monitor their liquidity and, at the same time be interested in, and try to obtain, available information concerning the liquidity of their customers, more closely monitor the average settlement period for debtors, and make the best use of all available credit management tools. Companies should also adopt preventive measures to avoid further overdue debts. The most effective preventive measure is to examine the credit status of trading partners in advance and grant trade credit only to reliable and economically strong partners. Recovering overdue debts immediately is essential. A number of possibilities of recovering debts exist, such as extra-judicial procedures, a firm's own capacities (i.e. telephone notices), or companies specialising in credit management and recovery. The judicial process and enforcement recovery may also provide a solution.

A relatively new phenomenon which has great potential to enhance innovative actions within liquidity management is corporate treasury management. Liquidity is the most important function in the activities of corporate treasury, and it links all its other functions (Blach et al., 2014). Modern complex and efficient corporate treasury management applying new financial instruments and supporting new technological advances may affect company liquidity in a significantly positive way. Since a firm's goodwill and image are built on liquidity, companies should be liquid in their activities at each point in time. A com-

pany which fails to pay is exposed to loss of reputation, and hence competitiveness, which may lead to its long-term insolvency or even bankruptcy.

Conclusions

Liquidity analysis is among the core activities undertaken by analysts in financial management and decision-making. As one of the most important indicators of the financial situation of a business, it has a significant impact on the firm's overall financial stability. The relationship between liquidity and financial stability is mutual, as it is a fact that a financially stable company is able to meet its obligations whilst a financially distressed company fails to do so.

The aim of the article was to analyse the development of liquidity in engineering companies operating in the selected industry (SK NACE rev. 2 28xxx – Manufacture of machinery and equipment not elsewhere classified) in the Slovak Republic during the period of 2015-2018 and identify the key internal and external factors which determine liquidity in the industry.

The analysis of the liquidity ratios revealed that the engineering companies in the analysed industry reported the growth of their values over the analysed period of 2015-2018. The multi-annual increase of the values of liquidity ratios corresponds with their mean values published by CRIF. The growth of liquidity after 2015 is due to the impact of a number of positive factors in the mechanical engineering industry. The results of the Friedman and Wilcoxon tests show that engineering companies in the Slovak Republic in the given industry (manufacture of machinery and equipment not elsewhere classified) consider adequate and regular cash flows ensuring the settlement of due debts, accounts receivable and accounts payable as the driving internal financial factors affecting liquidity. They regard the active search for new

opportunities and prompt response to market demands as key internal non-financial factors. They identified secondary insolvency and globalisation (internationalisation) as being crucial external factors affecting the liquidity of a firm. The hypothesis assuming that engineering companies in the analysed industry consider adequate and regular cash flows to be the most important internal factor affecting liquidity was confirmed. Equally, the hypothesis assuming that companies view secondary insolvency as the key external factor affecting a firm's liquidity was also accepted.

The issue of factors affecting a firm's liquidity - broken down as presented in this article - has hitherto not received sufficient attention from academic researchers. The article provides some new scientific insights and brings about an improvement of current knowledge in this area. A thorough analysis and knowledge of those factors are an essential requirement of the informed adoption of measures aimed at ensuring a firm's liquidity. As the results of our research show, non-financial factors, which are overlooked by managers to a certain extent, also proved to be very significant for the liquidity of the analysed companies in Slovakia. Liquidity analysis is an integral part of business financial analysis. Its results allow companies to take effective measures to support their favourable development.

The main conclusion of the research is the identification of the key internal and external factors determining the liquidity of engineering companies. The enrichment of the research into factors affecting the liquidity of mechanical engineering firms in the Slovak Republic (both internal non-financial and external factors) can be regarded as a contribution of this article. The fact that the empirical results are derived from the sample of Slovak SMEs representing only one segment of the mechani-

cal engineering industry may be viewed as a certain limitation of our study. In future research, we would like to focus on enterprises of various activities including the market services and retail sectors.

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Lubica Lesáková is a Professor of Business Economics and Management at the Faculty of Economics of Matej Bel University in Banská Bystrica (the Slovak Republic). Her research focuses on small and medium-sized enterprises and innovations. She has published more than 100 articles in scientific journals and proceedings of international conferences. <https://orcid.org/0000-0002-7920-6508>

Miroslava Vinczeová is an Associate Professor at the Department of Business Economics and Management of the Faculty of Economics of Matej Bel University in Banská Bystrica (the Slovak Republic). In her scientific research, she focuses on the issues of financial management and financing of small and medium-sized enterprises and innovations. She has published over 50 articles in scientific journals and proceedings of international conferences. <https://orcid.org/0000-0001-5380-0907>

Veronika Špiner completed her doctoral study of Business Economics and Management at the Faculty of Economics of Matej Bel University in Banská Bystrica in 2018. She has been working as a specialist in the economic department at the large machinery company Tatravagonka in Poprad for 10 years.